**3GPP TSG-RAN WG2 Meeting #118-e R2-22xxxxx**

**Online, May 9 - 20, 2022**

**Agenda item:** 6.14.1.2

**Source:** China Unicom (Rapporteur)

**Title:** Report of [AT118-e][079][QoE] 38300

**Document for:** Discussion

# Introduction

This document is capturing the following discussion:

* [AT118-e][079][QoE] 38300 (China Unicom)

Scope: Take into account online progress, address offline FFSes and non-treated proposals. Consider CR proposals, Review Rapporteur CR resolutions. Determine agreeable parts. Update CR to reflect agreeable parts and agree CR. Can consider LS out if agreed to be needed.

Consider: R2-2204591, R2-2204848, R2-2204847, R2-2205440, R2-2205943

Intended outcome: Report, Agreed CR (in the end)

Deadline: CB W2 Wed (if needed), CR can be finally agreed in a post-meeting disc.

**This email discussion is divided into two phases:**

**Phase 1: Collect comments for proposals in companies’ contributions. Deadline: Tuesday May 17, 2022, 12:00 UTC. And then the rapp will provide a summary, and if needed, some CB online discussions may be needed.**

**Phase 2: Discuss the 38.300 CR and then agree on the final version. Dealine: Friday May 20, 2022, 10:00 UTC. As indicated above, if the CR still needs more time to be checked, it will be finally agreed in a post-meeting disc.**

**This discussion document only includes potential controversial changes proposal. Other minor editorial and potentially less controversial changes have been captured in R2-22xxxxx draft 38.300 CR with minor changes for QoE.**

# Phase 1: Discussion

## On section: 21.2 QoE Measurement Configuration

Proposals from R2-2204847 on QoE Measurement Collection Activation and Reporting:

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| 21.2.1 QoE Measurement Collection Activation and Reporting …  The QoE measurement collection is handled by application layer measurement configuration and measurement reporting, supported in RRC\_CONNECTED state only. Application layer measurement configuration received by the gNB from OAM or CN is encapsulated in a transparent container, which is forwarded to a UE as Application layer configuration in the *RRCReconfiguration* message (there can be multiple configurations in the same message). Application layer measurement reports received from UE's application layer are encapsulated in a transparent container and sent to the network in the *MeasurementReportAppLayer* message, as specified in TS 38.331 [12]. The UE can send multiple application layer measurement reports to the gNB in one *MeasurementReportAppLayer* message. In order to allow the transmission of application layer measurement reports which exceed the maximum PDCP SDU size, segmentation of the *MeasurementReportAppLayer* message may be enabled by the gNB. AnRRC identifier conveyed in the RRC signalling is used to identify the application layer measurement configuration and report between the gNB and the UE. The RRC identifier is mapped to the QoE Reference in the gNB. The application layer measurement report is forwarded to OAM together with the QoE Reference. gNB can release one or multiple application layer measurement configurations from the UE in one *RRCReconfiguration* message at any time. The UE may additionally be configured by the gNB to report when a QoE measurement session starts or stops for a certain application layer measurement configuration. |

**Q1: Do you agree to** **replacing the term “higher layer” with “application layer” and replaced the “measConfigAppLayerId” with “RRC identifier” based QoE proposed by R2-2204847 from section 21.2 on QoE Measurement Collection Activation and Reporting?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | No for “application layer”  Yes for “RRC identifier” | On whether we change “higher layer” to “application layer”, we do not think this is needed. It is already clear that we are talking about “Application Layer Measurement Reports”.  On the “RRC identifier”, we support this change to have better consistency (currently the word “RRC identifier” is already used in the subsequent sentence). |
| Lenovo | Yes | Proponent.  Regarding the 1st change: it’s about consistent use of terminology. E.g. in 21.2.2 it is said *“The UE discards the reports received from application layer when it has no associated application layer measurement configuration configured.”*  Regarding the 2nd change: we think that such stage 3 detail can be omitted from stage 2. This change also applies for 21.4. |
| Huawei, HiSilicon | Yes for “RRC identifier” | The “RRC identifier” has been used in other places for NR QoE, so it is ok to have it. No strong view on the other change. |
| Ericsson | No to “RRC identifier” | No strong view on “application layer”. We prefer to use measConfigAppLayerId as it is then clearer which ID that is meant. |
| Nokia | Yes for “RRC identifier” | Use of “higher layer” is aligned with RRC specification |
| ITRI | No for “RRC identifier” | We think that measConfigAppLayerId may still be used here for clarity. |
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## On section: 21.2 QoE Measurement Configuration

Proposals from R2-2205943:

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| 21.2.3 Handling of QMC during RAN Overload QoE Measurement Collection pause/resume procedure is used to pause/resume reporting of one or multiple QoE configurations in a UE in RAN overload situation.  gNB can use the *RRCReconfiguration* message to temporarily stop application layer measurement reports associated to one or multiple application layer measurement configurations from being sent from the UE to the gNB. When the UE receives the QoE pause indication, UE temporarily stores application layer measurement reports in AS layer except for RAN visible QoE metrics. When the UE receives the QoE resume indication, UE sends the stored application layer measurement reports to the gNB. |

**Q2: Do you agree on the simplified text and the addition to clarify that UE does not store RAN visible QoE metrics proposed by R2-2204994?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | Yes | We are fine with these changes |
| Lenovo | Yes (1st change),  No (2nd change) | On the 2nd change: clause 21.2 is about the (regular/basic/legacy) QoE measurement configuration so there is no need to mention RVQoE. Furthermore, the handling of RVQoE metrics during RAN overload is described in 21.4. |
| Huawei, HiSilicon | Yes | Proponent. |
| Ericsson | Yes to first, no to second. | First change is fine. We would prefer not to do the second change, or to modify it. If we agree on terminology for “legacy QoE”, we could add it after “UE temporarily stores OAM application layer ….”. |
| Nokia | Yes for the first change  No for the second | Pause does not impose “exception” for RAN visible QoE – it does not apply |
| ITRI | Yes | Proponent. |
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## On section: 21.4 RAN Visible QoE Measurements

Proposals from R2-2205943 and R2-2204847 to remove the undefined words and reword the text.

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| 21.4 RAN Visible QoE Measurements RAN visible QoE measurements are configured by the NG-RAN node, where a subset of QoE metrics is reported from the UE as an explicit IE readable by the NG-RAN node. RAN visible QoE measurements (e.g., RAN visible QoE metrics) could be utilized by the NG-RAN node for network optimization. RAN visible QoE measurements are supported for the DASH streaming and VR services. The NG-RAN node configures the RAN visible QoE measurement to collect all or some of the available RAN visible QoE metrics, where the indication of metric availability is received from the OAM or CN. The set of available RAN visible QoE metrics is a subset of the metrics which are already configured as part of QoE measurement configuration encapsulated in the transparent container. The PDU session ID(s) corresponding to the service that is subject to QoE measurements can also be reported by the UE along with the RAN visible QoE measurement results.  …  RAN visible QoE measurements can only be configured if there is an associated QoE measurement for the same service type configured at the UE. Multiple RAN visible QoE measurements can be configured simultaneously to a UE, and each RAN visible QoE measurement configuration is identified by the same RRC identifier as the associated QoE measurement configuration. gNB can release one or multiple RAN visible QoE measurement configurations from the UE in one *RRCReconfiguration* message at any time.  After receiving the RAN visible QoE measurement configuration, the UE AS layer forwards the configuration to the application layer, indicating the service type, the RRC identifier and the periodicity (if configured). The application layer sends the collected RAN visible QoE measurements associated with the RRC identifier to the UE's AS layer.  … |

**Q3a: Do you agree to remove the undefined “RAN visible QoE values” proposed by R2-2205943?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | Yes and also … | We tend to think the whole bracket can be removed actually, as these examples do not provide too much more information and seem to be redundant from our perspective:  RAN visible QoE measurements ~~(e.g., RAN visible QoE metrics)~~ could be utilized by the NG-RAN node |
| Lenovo | Yes but | We wonder about the example part “e.g., RAN visible QoE metrics”. Are there are types of RAN visible QoE measurements? To be clear we suggest to replace it by the following:  “RAN visible QoE measurements (i.e., collected RAN visible QoE metrics) ...” |
| Huawei, HiSilicon | Leave the “RAN visible QoE values” as it is | We proposed this change because we did not find anything about it in previous RAN2 agreements.  We re-checked the text “RAN visible QoE values”. At RAN3#115-e meeting, there were some agreements on QoE values:  - RAN-visible QoE values: a set of values derived from QoE metrics data through a model/function defined in collaboration with SA4 (pending SA4).  Send an LS asking SA4 input on how RVQOE values can be defined, for the metrics selected for RVQOE support and whether the UE can generate RVQOE values.  And then the text was agreed in the following BL CR (later merged to the final TS 38.300 CR). We think that this text means the network can get QoE values based on the collected QoE metrics, and it is RAN3 agreement. In RAN2, we did not discuss QoE values before and there should be no extra impacts on RAN2. So we think this text can be left without any change.  *R2-2204174 38.300 BL CR for Introduction of QoE measurements in NR R3 (China Unicom, Ericsson, ZTE, Huawei, Nokia, Nokia Shanghai Bell, Samsung, CATT)* |
| Ericsson |  | We think the first change is not needed. It is a bit hard to see the purpose of the clarification within brackets. We think the whole part within brackets can be removed, it doesn’t clarify anything.  The second change is fine, but we would prefer to use measConfigAppLayerId instead of RRC identifier. Using RRC identifier puts extra burden on the reader to find out what the RRC identifier is. |
| Nokia | Yes, but | Agree with Apple |
| ITRI | Yes, but | Agree with Apple to remove the whole bracket. RAN visible QoE metrics are defined in the subsequent sentences. |
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**Q3b: Do you agree to remove the rewording text proposed by R2-2204847?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | No | We do not see much critical issues with the original text and how the TP is R2-2204847 is better, so it is questionable if we really need to have such a major overhaul of text in the maintenance phase.  Having said that, we agree the original text may not be perfect, and RAN2 could try to refine it later on. |
| Lenovo | Yes | Proponent. The intention is to remove the redundant text below:  “RAN visible application layer measurement is supported only for streaming and VR services. The gNB can use RAN visible application layer measurement configurations to instruct the UE to collect application layer measurements for RRM purposes.”  Further intention is to group the descriptions logically and place them in order. |
| Huawei, HiSilicon | No | It may be good to focus on the critical change, e.g. as mentioned by Lenovo, rather than too much changes. |
| Ericsson | Yes | In general fine with the proposed changes, but might have some comments after merging with the rapporteur CR. We think it is good to improve the text. |
| Nokia | No strong view | Have sympathy for simplified text, but also agree with Huawei |
| ITRI | Yes | No strong view, but the rewording text is more concrete. |
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Proposals from R2-2205943 on the rewording of the none-paused RAN visible reports:

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| RAN visible application layer measurements are not subject to QoE pause/resume indications, i.e. if configured, they are reported by the UE even though the corresponding non RAN visible application layer measurement reporting is paused |

**Q3c: Do you agree on the rewording text proposed by R2-2205943?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | No | We think the text proposal in the Rapporteur CR (R2-2204591) sounds better:  The UE continues to report the configured RAN visible application layer measurements, when the corresponding non RAN visible application layer measurement reporting is paused. |
| Lenovo | Yes | It looks better than the current text. |
| Huawei, HiSilicon | Yes | But also ok with the text in the Rapp CR R2-2204591. |
| Ericsson | No | We also prefer the text proposal in the rapporteur CR. |
| Nokia | Yes |  |
| ITRI | Yes |  |
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## On the naming of “regular” QoE

R2-2205440 proposed to rename the Application layer measurements configured by OAM to “OAM-QoE measurements”, and add the definitions of “OAM-QoE measurements”, “OAM-QoE report”, “RAN visible QoE measurements” and “RAN visible QoE measurements” in both stage-2 and stage-3 CR.

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| 3.2 Definitions  For the purposes of the present document, the terms and definitions given in TR 21.905 [1], in TS 36.300 [2] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1] and TS 36.300 [2].  [..]  **Numerology**: corresponds to one subcarrier spacing in the frequency domain. By scaling a reference subcarrier spacing by an integer *N*, different numerologies can be defined.  **OAM-QoE measurements:** UE application layermeasurements configured by the OAM for different service types.  **OAM-QoE report:** the result of OAM-QoE measurements.  **Parent node**: IAB-MT's next hop neighbour node; the parent node can be IAB-node or IAB-donor-DU  **PC5 Relay RLC channel**: an RLC channel between L2 U2N Remote UE and L2 U2N Relay UE, which is used to transport packets over PC5 for L2 UE-to-Network Relay**.**  **PLMN Cell**: a cell of the PLMN.  **RAN visible QoE measurements:** a subset of OAM-QoE measurements configured by the gNB and reported to the NG-RAN node.  **RAN visible QoE report:** the results of RAN Visible QoE measurements, reported from the UE the gNB in RRC format.  **RedCap UE:** A UE with reduced capabilities as specified in clause 4.2.21.1. in TS 38.306 [11].  [..]  21.1 Overview  The QoE Measurement Collection function enables collection of application layer measurements from the UE. The supported service types are:  - QoE Measurement Collection for streaming services;  - QoE Measurement Collection for MTSI services;  - QoE Measurement Collection for VR services.  Both signalling based and management based QoE measurement collection are supported.  NOTE: The naming QoE Measurement is used in NG, Xn, and interfaces between the OAM and the gNB. In the Uu interface, the naming application layer measurement is used and it is equal to QoE Measurement.  The QoE Measurement Collection function can support two types of QoE measurements:  - OAM-QoE measurements;  - RAN Visible QoE measurements.  The QoE Measurement Collection function can support two types of QoE reports:  - OAM-QoE reports, for reporting OAM-QoE measurements from the UE to the MCE;  - RAN Visible QoE reports, for reporting RAN Visible QoE measurements from the UE to the gNB. |

**From Rapporteur’s view, it’s clear to use QoE Measurement/report and RAN visible QoE measurement/report in NR NG, Xn interface, and use application layer measurement/report and RAN visible application layer measurement/report in the Uu interface. Besides, RAN3 are discussing the same issue in RAN3#116-e meeting now, so it’s suggested to wait for RAN3’s decision if there are needs to rename the “regular” QoE.**

**Q4: Do you agree with the Rapporteur’s view or has any other suggestions?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | Yes (with some suggestions on the definitions) | We acknowledge the importance of terminology alignment, and we can wait for RAN3 to clarify.  If any definition is to be introduced at this stage, we have some suggestions on rewordings:  **OAM-QoE measurements:** ~~UE~~ the application layermeasurements configured by the OAM for different service types.  **OAM-QoE report:** the result of OAM-QoE measurements, which is to be reported to the MCE.  **RAN visible QoE measurements:** a subset of OAM-QoE measurements configured by the gNB ~~and reported to the NG-RAN node~~.  **RAN visible QoE report:** the results of RAN Visible QoE measurements, which is to be reported to the NG-RAN node.~~, reported from the UE the gNB in RRC format~~. |
| Lenovo | Yes | It’s not critical and we should avoid double-work. But we are in-principle ok to introduce definition of measurement/report for QoE and RVQoE. But we are not ok with the acronym “OAM-QoE”. Firstly, it looks awkward. Secondly, it would require a lot of changes in stage 3. Whenever “QoE” is referenced, it has to be replaced by “OAM-QoE”. |
| Huawei, HiSilicon | Yes | We see that the changes include “NG-RAN”, and it should be gNB. |
| Ericsson |  | We think it would be really useful to have a name for “regular/legacy QoE”, but we don’t need to change in all places in the specifications. It could be used in places where a distinction is needed. We are fine to let RAN3 discuss and agree on this. |
| Nokia | No, but | We think the definitions as such could be introduced, but:   1. no need to distinguish for “configuration” and “reporting” 2. No need to mention “OAM” OAM-QoE is never used term elsewhere in RAN2 specifications, also give the impression it is only OAM originated, while for Signalling based QoE it can go through AMF?   Sufficient would be:  QoE Measurement Collection – [as this term was used in other WGs] – container based QoE measurement collection  RAN Visible QoE – a subset of QoE Measurement Collection configured to the UE by decodable RRC signalling (i.e. non-container based) |
| ITRI | Yes | We prefer to wait for RAN3’s decision. |
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## On the transmitting RVQoE reports with QoE reports

R2-2204848 proposed some proposals on the requirements for transmitting RVQoE reports together with QoE reports, which leave the following FFSs:

* FFS if RAN2 to confirm that it is left to UE implementation how to send QoE and RVQoE reports to the gNB.
* FFS if RAN2 to agree to replace the RAN3 requirement in stage 2 saying “If there is no reporting periodicity defined in the RAN visible QoE configuration, RAN visible QoE reports should be sent together with the legacy QoE reports” by “If there is no reporting periodicity defined in the RAN visible QoE configuration, the reporting periodicity of the associated QoE measurement configuration shall be applied”.

Proposal by R2-2204847 on the replacement of RAN3 requirement in stage 2 as below:

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| RAN visible QoE measurements can be reported with a reporting periodicity different from the one of regular QoE measurements. If there is no reporting periodicity defined in the RAN visible QoE configuration, the reporting periodicity of the associated QoE measurement configuration shall be applied. The UE can send multiple RAN visible QoE reports to the gNB in the same MeasurementReportAppLayer message. |

**Q5: Do you agree that it’s based on UE implementation on how to send QoE and RVQoE reports to the gNB and the rewording text“If there is no reporting periodicity defined in the RAN visible QoE configuration, the reporting periodicity of the associated QoE measurement configuration shall be applied. The UE can send multiple RAN visible QoE reports to the gNB in the same MeasurementReportAppLayer message” in stage-2 CR?**

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| **Company** | **Yes/No** | **Comments** |
| Apple | This depends on the outcome of [078] | We agree it can be up to UE implementation on how to send QoE and RVQoE to the gNB.  However, on the CR per se, we can wait until the outcome of [078] (Q5 in [078]) is concluded, where it has been suggested that we may assume reporting periodicity for RVQoE is always configured, such that the UE behaviour in this case does not have to be defined. |
| Lenovo | Yes but | Proponent and we can wait for the outcome of [078].  We think that the “should” requirement added by RAN3 is in contradiction with the RAN2 agreements made and which have been captured by the sentence below in 21.4:  “UE can send both RAN visible application layer measurement reports and the application layer measurement reports to the gNB in the same MeasurementReportAppLayer message.”  Furthermore, we did not propose to add the sentence “The UE can send multiple RAN visible QoE reports to the gNB in the same MeasurementReportAppLayer message.” since this is already covered by the sentence above. |
| Huawei, HiSilicon | Wait for [078] |  |
| Ericsson |  | Wait for [078]. |
| Nokia | Yes |  |
| ITRI |  | We can wait for the outcome of [078] and discuss it then. |
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## On further changes captured in draft CR

**Various minor changes proposed by various contributions have been captured in** **R2-22xxxxx draft 38.300 CR with minor changes for QoE.**

**Q6: Do you agree with the changes proposed in this draft? Did you add comments into this draft?**

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| **Company** | **Comments** |
| Apple | We are concerned with the highlighted parts of the following sentence in 21.4:  … The RAN visible QoE measurements (e.g., RAN visible QoE metrics, RAN visible QoE values) can be utilized by the gNB for the purpose of RRM network optimization. …  From our perspective, “network optimization” is a generalized term that already covers RRM, not sure why we need to mention RRM explicitly – this sounds redundant. |
| Lenovo | 1. In cover page, “Reason for change” there is a typo: “NR-RAN” should be “NG-RAN”. 2. In 21.1:   The sentence “The QoE measurement collection is supported in RRC\_CONNECTED state only.” has been added w/o change marks.   1. In 21.2.1:   We don’t see the need to replace “RRC identifier” with “measConfigAppLayerId”. Such stage 3 detail can be omitted in stage 2.  Furthermore, in the sentence below “MCE” has been added what is correct. However, “OAM” should then be removed, see reference message flows in TR 38.890.  “…the application layer measurement report is forwarded to OAM/MCE together with the QoE Reference ID.”   1. In 21.3:   In the sentence below “the target gNB” should be kept between “QoE” and “decides”. Otherwise the sentence looks bit odd.  “For signalling based QoE, at handover to a target gNB that supports QoE decides which of the application layer measurement configurations should be kept and or released, e.g. …”  And in the last sentence “supporting” should be corrected to “support”:  “When the UE resumes the connection with a gNB that does not supporting QoE, the UE releases all application layer measurement configurations.”   1. In 21.4:   We think the word “legacy” can be simply removed instead of replacing it with “non-RAN visible”.  Same as in 21.2.1 we don’t see the need to replace “RRC identifier” with “measConfigAppLayerId”. Such stage 3 detail can be omitted in stage 2.   1. In 21.5: In the sentence below we wonder about “can” since the UE will send this indication only upon gNB configuration and not dependent on UE capability. So, we think it should be removed.   “The UE configured with QoE measurements can send an indication to inform the gNB about the start or the stop of a session of configured QoE measurements.” |
| Huawei, HiSilicon | For Apple’s concern, we think RRM is for the detailed purpose for optimizations, e.g. the network can better manage Radio Resource based on conventional information and QoE information. In addition, the current TS 38.300 has some examples for such wordings: Mobility Robustness Optimization, RACH Optimization, PCI Optimization Function.  We can be also fine to simplify the wording if it brings some confusions. |
| Ericsson | In general we are fine, but we will review further when all changes have been merged. |
| Nokia | Ok, to minor changes, but “for RRM purposes” may be limiting, why no other purposes? We believe its up to NW how to utilize the QoE |
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# 3 Conclusion

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# 4 References

1. R2-2204591 38.300 CR Correction for Introduction of QoE measurements in NR China Unicom, Huawei, HiSilicon, Ericsson, Apple CR Rel-17 38.300 17.0.0 0441 - F NR\_QoE-Core
2. R2-2205943 Corrections to TS 38.300 for NR QoE Huawei, HiSilicon
3. R2-2205440 Discussion on naming of QoE measurements Ericsson discussion Rel-17 NR\_QoE-Core
4. R2-2204848 Discussion on NR QoE issues Lenovo discussion Rel-17 NR\_QoE-Core
5. R2-2204847 Corrections to stage 2 NR QoE description Lenovo draftCR Rel-17 38.300 17.0.0 NR\_QoE-Core